

REMARKS

Reconsideration of the rejections set forth in the Office Action is respectfully requested.

Rejection under 35 USC 101

Claims 1, 15-24, and 27 were rejected under 35 USC 101 as failing to comply with the written description requirement. Specifically, the Examiner has taken the position that the written description did not describe that the first and second level networks were implemented as “ad-hoc” networks. Thus, the Examiner concluded, that amending the claims to recite that the first and second level networks are “ad-hoc” networks constituted adding new matter. Applicants respectfully traverse this rejection.

First, the applicants point out that the applicants described these networks as being implemented as “ad hoc” networks within the specification. Thus, adding this feature to the claims cannot constitute new matter. For example, at Page 4, lines 8-12, applicants state:

by making the inter-mesh communication points mobile, the inter-mesh communication points are able to follow the transitory migration patterns of the network users, to allow the inter-mesh communication points to move to where data traffic densities are the highest. This allows extra band-width to be enabled to cover emergency situations and large venues, as well to solve *ad-hoc* network requirements. (Emphasis added)

Similarly, on page 13, lines 25-27, applicants state:

Likewise, where enhanced bandwidth is desired to be deployed, such as to meet the *ad-hoc* requirements of the network, additional inter-mesh communication points may be activated. (Emphasis Added)

As is clear from these passages, applicants actually use the term *ad-hoc* when describing that these networks are implemented as ad-hoc networks.

Second, other portions of the specification very clearly describe, from a functional standpoint, that the networks are organized as ad-hoc networks. The term “ad-hoc” is commonly used to mean without planning. In a wireless networking context, the term “ad-hoc” is commonly used to refer to a wireless network where the wireless nodes do not rely on fixed access points for connectivity, but rather each node participates in routing by forwarding data for

other nodes.¹ Accordingly, in an ad-hoc network the determination of which nodes forward data is made dynamically based on available network connectivity.

Applicants clearly describe throughout the specification that both wireless mesh networks are deployed in an unplanned (i.e. ad-hoc) manner, where the wireless nodes do not rely on fixed access points for connectivity, but rather each node participates in routing by forwarding data for other nodes.

For example, on page 2, lines 3-7, applicants describe the access network as functioning as an ad-hoc wireless mesh network: “One example of a mesh network is an 802.11b access mesh. If a set of users in close geographical proximity are equipped with 802.11b cards, they can communicate with other users in a series of hops until reaching an access point of the network.” This describes that the first level access network is functioning as an ad-hoc wireless network, because it describes that the access network is changing and adapting as the inter-mesh communication points move around, and that nodes of the first level network participate in forwarding communications for other nodes of the first level mesh network.

Likewise, in connection with the backhaul network, applicants describe in the specification at page 9, lines 12-14 that “the inter-mesh communication points may be connected to the WAN base station 18 or may rely on other inter-mesh communication points to direct traffic to the WAN base station 18”. This describes that the second level backhaul network is functioning as an ad-hoc wireless network since the backhaul network, like the access network, is adapting as the inter-mesh communication points move around and the nodes of the backhaul network are participating in forwarding communications for other nodes of the second level mesh network.

¹ See Elson (U.S. Patent No. 7,161,926, at Coll. 1, lines 30-42: “A basic assumption of ad hoc wireless networks is that there is no pre-existing network infrastructure. This means that the network nodes must establish communication routes among themselves in order to transfer information through the network. Algorithms devised for network self-assembly, clustering, and multi-hop routing include those described by K. Sohrabi, J. Gao, V. Ailawadhi, and G. Pottie in, “A Self-Organizing Sensor Network,” Proc. 37.sup.th Allerton Conf. On Comm., Control, and Computing, Monticello Ill., September 1999. These algorithms can for example enable arbitrarily large networks to self-assemble, and permit multi-hop routing over large geographic areas under varying conditions of node mobility.”

According to MPEP 2163: “To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention.” Since applicants use the term “ad-hoc” in connection with describing the first and second level mesh networks, as well as describe in great detail the functionality of the ad-hoc nature of both the first level and second level networks, applicants respectfully submit that the specification as originally submitted clearly taught to a person of skill in the art that the wireless networks were implemented as ad-hoc networks. Accordingly, the Examiner is respectfully requested to withdraw the rejection under 35 USC 101.

Rejection under 35 USC 103

Claims 1-5, 8-24, and 27 were rejected under 35 USC 103 as unpatentable over Garahi, et al. (U.S. Patent Application Publication No. 2003/0091010) in view of Csapo (U.S. Patent Application Publication No. 2004/0253984), and further in view of Wirbel “IEEE 802.16 Spec Could Disrupt Wireless Landscape.” This rejection is respectfully traversed in view of the following arguments.

This application relates to a mobile inter-mesh communication point that is configured to connect between a first level ad-hoc wireless mesh access network and a second level ad-hoc wireless mesh backhaul, in which 802.11 is used as the access technology and 802.16 is used as the backhaul technology.

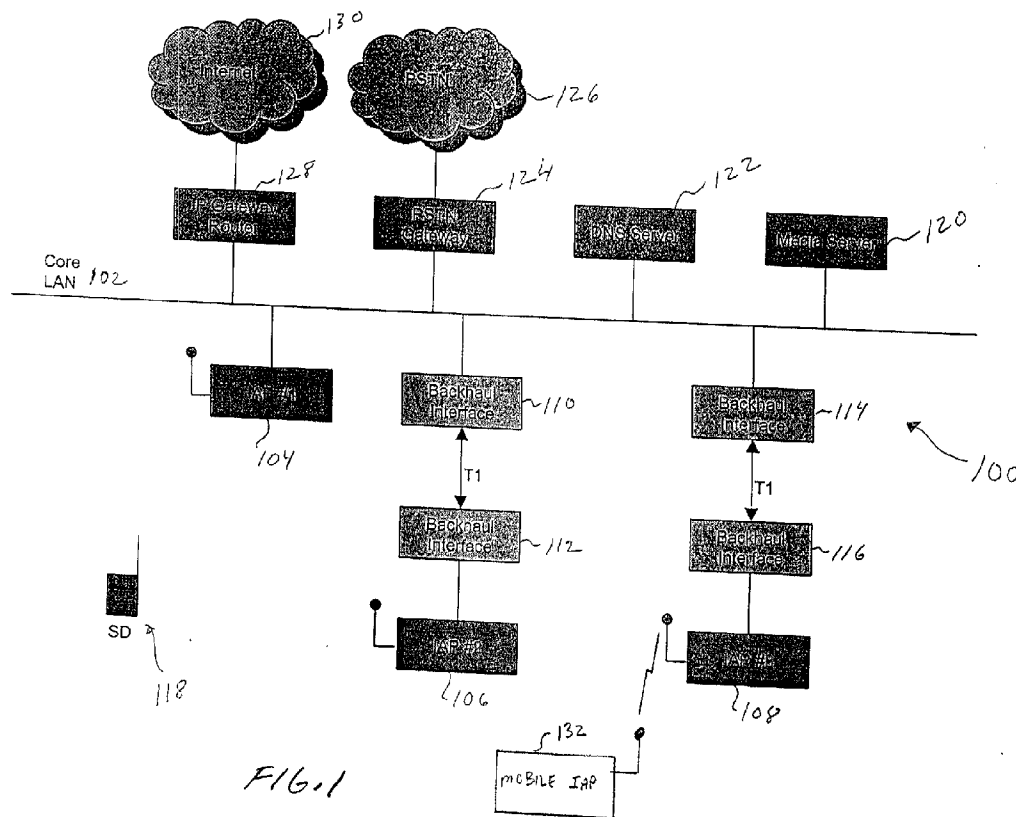
In the rejection, the Examiner has cited the combination of Garahi and Csapo as teaching an inter-mesh communication point that is configured to connect between a first level ad-hoc wireless mesh access network and a second level ad-hoc wireless mesh backhaul network. Wirbel was cited as teaching the use of 802.16 in the backhaul. Hence, the Examiner has taken the position that the combination of these three references renders the claims obvious.

Garahi teaches that the mobile terminals 118 and wired IAPs 104, 106, 108 implement an ad-hoc access network. (Garahi at Par. 30). In the response to arguments section of the Office Action, the Examiner stated that this paragraph of Garahi also taught that the backhaul should be implemented as an ad-hoc network. (Office Action at page 17). For convenience, paragraph 30 of Garahi is reproduced below. Since paragraph 30 refers to Fig. 1 of Garahi, this figure has also been reproduced below:

Garahi at paragraph 30:

As described in more detail below, an IAP 104, 106 and 108 operates to provide access for subscriber devices, such as mobile user terminals 118, to wired services provided by the network 100. Each IAP 104, 106 and 108 also provides a respective fixed and known position and location reference, relay and wireless routing for user terminals 118 within its area of coverage, and the principle network management interface with transceivers in wireless routers and subscriber devices, such as user terminals 118. Each wired IAP 104, 106 and 108 can be referred to generally as a "fixed node" on the network 100, while the mobile user terminal 118 can be referred to as a "mobile node". The wired IAP 104, 106 and 108 can also function as access points to the network 100 for user terminals 118 forming an ad-hoc network as described, for example, in U.S. patent application Ser. No. 09/897,790 entitled "Ad Hoc Peer-to-Peer Mobile Radio Access System Interfaced to the PSTN and Cellular Networks", filed on Jun. 29, 2001, and as in U.S. Pat. No. 5,943,322 to Mayor, the entire contents of each being incorporated by reference herein.

Fig. 1 of Garahi:



As shown in this figure, each IAP in this figure (IAP 104, 106, 108) is a fixed node which is connected to a backhaul interface. Paragraph 30 of Garahi states “Each wired IAP 104, 106 and 108 can be referred to generally as a “fixed node” on the network 100, while the mobile user terminals 118 can be referred to as a “mobile node.” Garahi then explains that these fixed nodes function as access points to the network 100 for the user terminals and that the user terminals form an ad-hoc network.

Thus, the user nodes and mobile terminals clearly form a first level (access level) ad-hoc mesh network. The backhaul network, by contrast, involves fixed nodes connected to the backhaul interface via T1 lines. There is nothing “ad-hoc” about the backhaul network. Thus, contrary to the Examiner’s suggestion, Paragraph 30 of Garahi does not teach or suggest that the

backhaul network should be implemented as an ad-hoc network. Rather, paragraph 30 of Garahi explicitly states that the backhaul network is implemented using fixed nodes which function as access points for user terminals. (See also Garahi at paragraph 29: “An IAP 104, 106 and 108 is configured to remain in a fixed location, such as on a building rooftop or in a building ceiling, and is provided with a permanent source of power, such as alternating current or any other suitable power source.”) This in fact teaches *away* from implementing an ad-hoc backhaul network and thus teaches away from the proposed combination, making the combination improper.

Paragraph 30 refers to an “ad-hoc network as described in U.S. patent application Ser. No. 09/897,790.” The patent application referred to by Garahi in Paragraph 30 has since issued as U.S. Patent No. 7,072,650 (Stanforth). The ad-hoc wireless network described in Stanforth has an ad-hoc 802.11 wireless network connected to the PSTN or cellular network via a gateway. Since Garahi states that his mobile/wired terminals operate as taught by Stanforth, it appears that this portion of Garahi teaches a one level ad-hoc wireless network connected to the PSTN/cellular network via a gateway.

Garahi also teaches that the IAPs can be mobile. (See Garahi at Paragraphs 34-42). When mobile IAPs are used, Garahi teaches that the mobile IAPs communicate with the wired IAPs using either a microwave backhaul or using a “self forming self healing radio access technology as described in U.S. patent application Ser. No. 09/897,790 [Stanforth].” (Garahi at Par. 38 emphasis added). Stanforth shows an ad-hoc 802.11 wireless access network connected via a gateway to a cellular network, but does not show a second level ad-hoc wireless mesh network. Accordingly, this portion of Garahi likewise does not teach or suggest two levels of ad-hoc mesh networks, but rather teaches the use of a single level ad-hoc mesh network.

In Fig. 5 of Garahi, the IAP 132 is disposed in vehicle 146 (see Paragraph 37), and “operates as a router to enable intercommunication between mobile terminals 118 which can be hand-held or present in other vehicles 154, 156.” (Garahi at Par. 39). Thus, in Fig. 5 the IAP is functioning as a router in the first level mesh network to allow user terminals such as handheld and car-based terminals in the first level mesh network to communicate with each other. This doesn’t address how the backhaul is operating but rather shows that the IAP is implemented as part of the *access* mesh network.

In connection with Fig. 6, Garahi states that “the mobile IAPs 132 can use each other in conjunction with another user terminal 118 in the ad-hoc network, such as a user terminal 118 present in a vehicle 154, to connect to a fixed IAP, such as IAP 108.” Since the user terminals 118 are operating in the first level mesh network, this portion of Garahi also teaches that the fixed and mobile IAPs are communicating with each other using the first level *access* meshed network, and has nothing to do with implementing a backhaul network. Specifically, Fig. 6 shows the mobile network bridging communication from one mobile IAP to another mobile IAP which then forwards the communication to the fixed IAP. This shows that the mobile unit and mobile IAPs are communicating with each other using the same mesh network as that being used by the mobile terminal and, hence, that the communication that occurs between the fixed and mobile IAPs is all part of the first level mesh network.

In the rejection, the Examiner has taken the position that Garahi teaches a mobile inter-mesh communication point citing Fig. 3, and paragraph 24 of Garahi. However, as discussed above, Garahi actually doesn’t teach two levels of mesh networking. Rather, Garahi teaches only one level of mesh networking. Garahi likewise references another patent for supporting details associated with the underlying network, and that referenced patent *also* shows a single level ad-hoc mesh network. While Fig. 3 does show a mobile IAP with multiple transceivers and antennas, that fact alone does not indicate that the mobile IAP is operating on multiple levels of wireless mesh networking. Rather, it would appear that the mobile IAP would use one transceiver to communicate with the 802.11 ad-hoc wireless mesh network and would use another transceiver to communicate with the point-to-point microwave backhaul. There is nothing to suggest that the backhaul is organized as an ad-hoc wireless mesh network.

In the rejection the Examiner cited Csapo as teaching a first wireless mesh network and a second wireless mesh network which is used as a backhaul to the first wireless mesh network, citing Csapo at paragraph 37. In paragraph 36, Csapo CIP states that the mobile station 246 is capable of communicating with a BTS 223 via a CDMA2000 link, an EDGE link, or a WCDMA link². By referring to these connections as “links” Csapo implies point-to-point connection and indicates that the backhaul is *not* an ad-hoc wireless mesh network as claimed.

² The Csapo reference also references 802.16e. However, the reference to 802.16e was added in a CIP application which was filed after the filing date of this application. Accordingly, the reference to 802.16 is not prior art to the claims of this application as acknowledged by the Examiner at page 4, lines 17-18 of the Office Action.

In paragraph 37 of the Csapo CIP application, Csapo teaches that the access points communicate with multiple mobile systems via 802.11 and that each of the access points will communicate with the backhaul via a CDMA2000, 1X/EV/DO, EDGE, WDCMA³ “link”. The text of paragraph 37, and Fig. 2 which is described in that portion of Csapo, does not teach or suggest that the BTSs should be organized as an ad-hoc mesh network. Rather, Fig. 2 shows a point-to-point link from each access point to one of the BTSs, and then shows wired point-to-point links from the BTSs to the BSC. The BTSs are not discussed as communicating with each other and the fact that the BTSs are wired via fixed links to the BSC indicates that the BTSs are not forming an ad-hoc wireless network.

Csapo, like Garahi, teaches a single level ad-hoc access wireless network implemented using 802.11. Csapo teaches that the backhaul should be implemented using CDMA2000, 1X/EV/DO, EDGE, WDCMA. Thus Csapo, like Garahi, fails to teach or suggest that the backhaul should be implemented using an ad-hoc wireless mesh network.

In the Office Action at page 4, lines 17-18, the Examiner stated that the combination of Garahi and Csapo fails to specifically point out the use of 802.16x as a backhaul, but contends that since 802.16 was a known backhaul technology, as discussed by Wirbel, that it would have been obvious to use 802.16 to implement the backhaul network.

As discussed above, the combination of Garahi and Csapo fails to teach or suggest implementing the backhaul network utilizing an ad-hoc wireless mesh network with mobile nodes functioning as inter-mesh access points. Accordingly, even if Wirbel does disclose 802.16 as a backhaul networking technology the combination of these three references fails to render the claims obvious.

Further, applicants respectfully submit that Wirbel teaches away from using 802.16 as a backhaul technology in an ad-hoc mobile environment. Accordingly, there would be no motivation to combine Wirbel into the system created using Garahi and Csapo.

In paragraph 3, Wirbel states “In an ideal world, Marks said, 802.16a can serve as a backbone for 802.11 hot-spots...” At the time of publication, 802.16a was a last mile fixed broadband access technology. 802.16a did not support mobility, which was being addressed by the working group developing 802.16e (Wirbel at paragraph 6). Note that the 802.16e task group

³ As noted above, the Csapo reference also mentions 802.16e. However, since the reference to 802.16 was not included in the parent application and only first appears in the Csapo CIP application, any reference to 802.16 is not prior art to the claims of this application.

was in the process of addressing mobility, but that standard was not finalized until 2005, which was several years after this application was filed. Further, Wirbel states that the 802.16e working group was not attempting to address high-speed handoffs in an automotive environment, but rather was merely seeking to add some level of mobility to wireless MANs. (Wirbel at paragraph 7 “When outsiders hear of such mobility goals, many assume that 802.16e is going after any broadband wireless metro market that might have been served by nascent 3G cellular services. In reality, Marks said, the task group has no interest in high-speed handoff in an automotive environment...”).

Wirbel is very scant on details associated with how 802.16 may be used as a backhaul technology. Although a non-enabling reference may qualify as prior art for the purposed of determining obviousness under § 103, *Symbol Tech. v. Opticon, Inc.*, 935 F.2d 1569, 1578, 19 USPQ2d 1241, 1247 (Fed. Cir. 1991), a reference is only considered as prior art for what it teaches. MPEP 2121.01. When looking to determine whether it would have been obvious to use 802.16 as a backhaul technology in a mobile environment, the teachings of Wirbel must be evaluated only for what it discloses, not for what it discloses in view of applicant’s proposal. See MPEP 2141.01(III) (explaining that it is improper to use hindsight to interpret the teachings of a reference).

In this instance, Wirbel teaches that 802.16x may be used as a backhaul technology. Wirbel does not teach or suggest that 802.16 may be used to implement an ad-hoc wireless mesh network. Wirbel further expressly teaches away from using 802.16 as a replacement for 3G cellular or other wireless technology where mobility is required. Accordingly, applicants respectfully submit that Wirbel does not teach or suggest using 802.16 as a technology for an ad-hoc wireless mesh backhaul network where the nodes within the backhaul network are mobile. Thus, Wirbel does not make up the deficiencies of the combination of Csapo and Garahi and further it would not have been obvious to combine Wirbel with Csapo/Garahi. Accordingly, applicants request that the rejection under 35 USC 103 be withdrawn.

Conclusion

In view of foregoing remarks, it is respectfully submitted that the application is now in condition for allowance and an action to this effect is respectfully requested. If there are any questions or concerns regarding these remarks, the Examiner is requested to telephone the

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undersigned at the telephone number listed below.

No fees are believed due in connection with this filing. If any fees are due, the Commissioner is hereby authorized to charge payment of the fees associated with this communication or credit any overpayment to Deposit Account No. 141315 (Ref: 16127ROUS01U).

Respectfully Submitted

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